

# IN THE CLAIMS

Please amend the claims as follows. This claim set is to replace all prior versions.

1. (Original) A modified surface wherein the adhesion or attachment of particles to the modified surface has been minimised or prevented by adjusting the Lifshitz-van der Waals (LW) surface free energy of an unmodified surface to be equal to or approximately equal to the Lifshitz-van der Waals (LW) surface free energy of particles in an environment surrounding the surface.

2. (Original) A modified surface according to claim 1 wherein the particles are foulants.

3. (Original) A modified surface according to claim 1 wherein the particles are selected from any of the following cells, proteins, prions, bacteria, amino acids, nucleic acids, metallic based compounds, organometallics, organic compounds, inorganic compounds or any other type of discrete separate particles.

4. (Original) A modified surface according to claim 1 wherein there is a surface with a Lifshitz-van der Waals (LW) surface free energy of  $\gamma_{\text{surface}}^{\text{LW}}$  on which the adhesion or attachment of particles is minimised or prevented by modifying the surface free energy  $\gamma_{\text{surface}}^{\text{LW}}$  of the surface in accordance with the Lifshitz-van der Waals (LW) surface free energy of the particles so that: .

$$\gamma_{\text{surface}}^{\text{LW}} \cong \gamma_{\text{S,Min}}^{\text{LW}}$$

wherein  $\gamma_{\text{S,Min}}^{\text{LW}}$  is the minimum level of attachment to a surface S and is defined as follows:

$$\sqrt{\gamma_{\text{S,Min}}^{\text{LW}}} = (1/2)(\sqrt{\gamma_{\text{particles}}^{\text{LW}}} + \sqrt{\gamma_{\text{environment}}^{\text{LW}}})$$

where  $\gamma_{\text{particles}}^{\text{LW}}$  is the LW surface free energy of particles, and  $\gamma_{\text{environment}}^{\text{LW}}$  is the LW surface free energy of an environment.

5. (Original) A modified surface according to claim 1 wherein the surface is one which comes into contact with cells and/or proteins and/or prions within a living human or animal body.

6. (Original) A modified surface according to claim 5 wherein there is a surface with a Lifshitz-van der Waals (LW) surface free energy of  $\gamma_{\text{surface}}^{\text{LW}}$  on which the adhesion or attachment of cells and/or proteins and/or prions is minimised or prevented by modifying the surface free energy  $\gamma_{\text{surface}}^{\text{LW}}$  of the surface in accordance with the Lifshitz-van der Waals (LW) surface free energy of the cells and/or proteins and/or prions so that:

$$\gamma_{\text{surface}}^{\text{LW}} \approx \gamma_{\text{S,Min}}^{\text{LW}}$$

wherein  $\gamma_{\text{S,Min}}^{\text{LW}}$  is the minimum level of attachment to a surface S and is defined as follows:

$$\sqrt{\gamma_{\text{S,Min}}^{\text{LW}}} = \left(\frac{1}{2}\right) \left( \sqrt{\gamma_{\text{cells and/or proteins and/or prions}}^{\text{LW}}} + \sqrt{\gamma_{\text{solution and/or whole blood}}^{\text{LW}}} \right)$$

where  $\gamma_{\text{cells and/or proteins and/or prions}}^{\text{LW}}$  is the LW surface free energy of cells and/or proteins and/or prions, and  $\gamma_{\text{solution and/or whole blood}}^{\text{LW}}$  is the LW surface free energy of a solution and/or of whole blood.

7. (Original) A modified surface according to claim 1 wherein the surface is modified with a coating of modified diamond-like carbon (DLC), Ag--PTFE-surfactant or Ni--Cu--P--PTFE wherein the coated surface inhibits bacterial adhesion and colonisation, thrombus adhesion to the surface and foulant formation.

8. (Original) A modified surface according to claim 1 wherein the surface is modified with a coating of diamond-like carbon (DLC) which is modified by incorporating

elements selected from any of the following: halogens; Group IV elements; Group V elements; Group VI elements; and transition metals.

9. (Original) A modified surface according to claim 8 wherein the elements are present in an amount of 0-40% by weight.

10. (Original) A modified surface according to claim 8 wherein the elements incorporated into the diamond-like carbon by co-sputtering.

11. (Original) A modified surface according to claim 8 wherein the elements are incorporated into the diamond-like carbon (DLC) using reactive gases, silicon organic monomers gaseous hydrocarbons O<sub>2</sub>, and/or N<sub>2</sub>.

12. (Original) A modified surface according to claim 7 wherein the modified diamond-like carbon (DLC) is deposited using any of the following methods: microwave plasma deposition, plasma-enhanced vapour deposition, plasma-induced cold deposition, magnetron sputtering and ion beam-assisted deposition.

13. (Original) A modified surface according to claim 7 wherein the surfactant in the Ag--PTFE-surfactant is non-ionic, anionic or cationic.

14. (Original) A modified surface according to claim 7 wherein the ration of Ag:PTFE:surfactant is about 80-60%:10-39%: 1 -10% by weight.

15. (Original) A modified surface according to claim 7 wherein the ratio of Ag:PTFE:surfactant is about 75%:22%:3% by weight.

16. (Original) A modified surface according to claim 7 wherein the surfactant in the Ag--PTFE-surfactant is selected from any of the following: C<sub>20</sub>H<sub>20</sub>F<sub>23</sub>N<sub>2</sub>O<sub>4</sub>I, and polyoxyethylene nonylphenyl ether.

17. (Original) A modified surface according to claim 7 wherein the surfactant in the Ag-PTFE-surfactant is selected from any of the following:  $C_{20}H_{20}F_{23}N_2O_4I$ , and polyoxyethylene nonylphenyl ether, and wherein the polyoxyethylene nonylphenyl ether is selected from any of the following: 4- $(C_9H_{19})C_6H_4(OCH_2CH_2)_nOH$ ,  $n \sim 12$ , Hydrophile Lipophile Balance (HLB)=12; 4- $(C_9H_{19})C_6H_4(OCH_2CH_2)_nOH$ ,  $n \sim 40$ , HLB=17.8; 4- $(C_9H_{19})C_6H_4(OCH_2CH_2)_nOH$ ,  $n \sim 100$ , HLB=19; and  $(C_9H_{19})C_6H_4(OCH_2CH_2)_nOH$ ,  $n \sim 150$ , HLB=19.

18. (Original) A modified surface according to claim 7 wherein the Ag--PTFE-surfactant coating is obtained using an electroless plating technique.

19. (Original) A modified surface according to claim 7 wherein the Ag--PTFE-surfactant coating is obtained using an electroplating technique.

20. (Original) A modified surface according to claim 7 wherein the Ni--Cu--P--PTFE coating is obtained using an electroless plating technique.

21. (Original) A modified surface according to claim 7 wherein the Ni--Cu--P--PTFE coating is obtained using an electroplating technique.

22. (Original) A modified surface according to claim 7 wherein the ratio of Ni:Cu:P:PTFE is about 97-40%:1-20%:1-20%:1-20% by weight.

23. (Original) A modified surface according to claim 7 wherein the Ni:Cu:P:PTFE ratio may be 80%:11%:4%:5% by weight.

24. (Original) A modified surface according to claim 1 wherein the surface which is coated is selected from any of the following: healthcare products; dental care products; baby care products; personal hygiene products; consumer cleaning and disinfectant products; institutional and industrial cleaning products; food preparation devices and

packaging; water storage products; water treatment products; water delivery systems; biofilm sensitive systems; and laboratory and scientific equipment.

25. (Original) A modified surface according to claim 1 wherein the modified surface is part of a medical device.

26. (Original) A modified surface according to claim 25 wherein the medical device is selected from any of the following: endoscopes and accessories; ophthalmic equipment; dental equipment; surgical instruments; heart valves; stents; catheters; joint prostheses; intraocular lenses, dental implants, electrodes and cable equipment.

27. (Original) A modified surface according to claim 1 wherein the modified surface inhibits the following bacteria: *Staphylococcus epidermidis*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Candida albicans* or any other microorganisms which could cause device-related infections.

28. (Cancelled.)

29. (Original) A device comprising a modified surface according to claim 1.

30. – 31. (Cancelled.)